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CERTIFICATION OF TRANSLATION

I, ***Sohee Kim***, an employee of Y.P.LEE, MOCK & PARTNERS of Koryo Bldg., 1575-1 Seocho-dong, Seocho-gu, Seoul, Republic of Korea, hereby declare under penalty of perjury that I understand the Korean language and the English language; that I am fully capable of translating from Korean to English and vice versa; and that, to the best of my knowledge and belief, the statement in the English language in the attached translation of ***Korean Patent Application No. 10-2002-0043397*** consisting of *11* pages, have the same meanings as the statements in the Korean language in the original document, a copy of which I have examined.

Signed this 28th day of June 2006

Sohee Kim

ABSTRACT

[Abstract of the Disclosure]

An optical information storage medium and a method of recording data on the optical information storage medium are provided. In the optical information storage medium, a reproduction-only area and a recordable area are included in an area other than a user data area. Every time user data is completely recorded, new data about a disk state is recorded in the recordable area. Due to the structure of the optical information storage medium, every time user data is completely recorded, recent data about a disk state is recorded. Thus, when new data is recorded, a pickup can rapidly access an accurate area in which the new data is to be recorded.

[Representative Drawing]

FIG. 2A

SPECIFICATION

[Title of the Invention]

An optical information storage medium and a method of recording data on the same

[Brief Description of the Drawings]

FIG. 1 schematically shows the data structure of an optical information storage medium according to one aspect of the present invention;

FIG. 2A shows disk state data recorded on an optical information storage medium according to one aspect of the present invention; and

FIG. 2B is a view for explaining a method of recording disk state data on an optical information storage medium according to one aspect of the present invention.

< Explanation of Reference numerals designating the Major Elements of the Drawings >

10... reproduction-only area 15... recordable area

15-a... optimum power control (OPC) zone

15-b... disk zone 15-c... drive zone

[Detailed Description of the Invention]

[Object of the Invention]

[Technical Field of the Invention and Related Art prior to the Invention]

The present invention relates to an optical information storage medium on which information about the state of a disk is newly recorded every time recording of user data is completed, and a method of recording data on the optical information storage medium.

General information storage media are widely used as information recording media of optical pickup apparatuses for recording/reproducing information in a non-contact way. Optical disks, which are information storage media, are classified as compact disks (CDs) or digital versatile disks (DVDs) according to their information storage capacity. Examples of recordable optical disks are 650MB CD-R, CD-RW, 4.7GB DVD/RW, DVD-RAM, and the like. Furthermore, HD-DVDs having a recording capacity of 20GB or greater are under development.

In particular, write-once information storage media, among recordable optical information storage media, are usually used as backup optical information storage media for PCs or as audio/video (A/V) optical information storage media. User data is recorded on write-once information storage media in order of physical addresses, and data is no longer recorded on a physical address at which data has already been recorded. Accordingly, when recording is stopped and then resumed, data will be recorded on an area next to the area containing the most recently recorded data. As described above, write-once information storage media requires a new physical data structure having characteristics different from those of rewritable optical information storage media.

[Technical Goal of the Invention]

The present invention provides an optical information storage medium in which data about a recent disk state is newly recorded upon every data recording so that an area in which new data is to be recorded can be rapidly accessed by a pickup using the recorded disk state data, and a method of recording data on the optical information storage medium.

[Structure and Operation of the Invention]

According to an aspect of the present invention, there is provided an optical information storage medium in which a reproduction-only area and a recordable area are included in an area other than a user data area, and new data about a disk state is recorded in the recordable area every time recording of user data is stopped.

The data about a disk state may be at least one datum selected from the group consisting of the address of an area containing newly recorded optimal power control (OPC) data, the address of an area containing the most recently recorded drive data, the address of an area containing the most recently recorded user data, and data representing whether additional recording after recording of user data is possible.

The data about a disk state may be recorded in the recordable area of a lead-in area.

When the data about a disk state is updated, new data about a disk state may be recorded in an area next to the area containing the most recently recorded disk state data.

According to another aspect of the present invention, there is provided a method of recording data on an optical information storage medium in which a reproduction-only area and a recordable area are included in an area other than a user data area. This method includes recording user data, and recording new data about a disk state in the recordable area every time recording of user data is stopped.

Preferred embodiments of the present invention will now be described with reference to the attached drawings.

Referring to FIG. 1, an optical information storage medium according to the present invention includes a reproduction-only area 10 and a recordable area 15 in the area other than a user data area. For example, the area other than a user data area can be a lead-in area located on the inner side of the user data area in the radial direction of a disk. The reproduction-only area 10 stores disk-related data, such as, the type, version number, size of a disk, the number of layers, and the like. This data is already recorded on a substrate in the form of pits or groove wobbles upon the manufacture of a disk and accordingly is only reproduced.

The recordable area 15 includes an optimum power control (OPC) zone 15-a for recording data used for optimal power control, a disk zone 15-b for recording data about disk states, and a drive zone 15-c for recording drive-related data. Examples of the disk state data include the address of an area containing new OPC data, the address of an area where the last drive information has been recorded, the address of an area where the last user data has been recorded, and data representing whether additional recording is possible or impossible after user data is recorded. At least one of these disk state data may be recorded on the disk zone 15-b.

The OPC zone 15-a records data about recording and/or reproduction power, which is used to record and/or reproduce user data, every time the user data is stopped. The recording and/or reproduction power can be optimally controlled based on the data about recording and/or reproduction power. Every time recording is performed, new data about power, which is used during recording, is recorded. In write-once optical information storage media, every time new recording is performed, OPC data is recorded on a new area where data is not recorded. Accordingly, when recording is completed and then new recording is executed, an area on which new OPC data is to be recorded must be searched for. Preferably, the address of the area containing the newly recorded OPC data is

recorded in a predetermined area so as to enable a rapid access. That is to say, the address of an area containing the most recently recorded OPC data is recorded on the disk zone 15-b. Upon new data recording, new OPC data can be rapidly accessed by only reproducing the address of the area containing the most recently recorded OPC data without a need to reproduce all of the OPC areas.

The drive zone 15-c records drive-related data, such as, data about a drive manufacturer or the serial number of a drive. Every time recording is executed, data about a drive that performs the recording is newly recorded. Hence, it is preferable that the address of an area containing the most recently recorded drive data is recorded as the disk state data. Accordingly, when new drive data is recorded, a position where the new drive data is to be recorded can be easily searched for by reproducing the recorded address of the area containing the most recently recorded drive data.

When recording of user data is interrupted and new data is recorded, a pickup must access an area where the new data is to be recorded. To achieve a rapid access, preferably, the address of the area containing the most recently recorded user data is recorded in a predetermined area.

As described above, if recent disk-related data is not provided, the OPC zone 15-a, the drive zone 15-c, or the user data area needs to be entirely read upon recording of user data. Thus, significantly much time is taken to access an area in which the user data is to be recorded.

Preferably, after recording of user data is completed, data representing whether additional data can be recorded on an area next to the area containing the finally recorded user data is recorded. In order to prevent further recording, data representing the impossibility of additional recording after completion of recording is recorded. On the other hand, if additional recording can be performed, data representing the possibility of additional recording after the completion of recording is recorded.

Every time data recording is completed, such disk state data is recorded in a predetermined area, for example, the disk zone 15-b, of the recordable area 15 included in a lead-in area. When new data is recorded, a pickup can accurately and rapidly access an area where the new data is to be recorded, using the recorded disk state data. The present invention is effectively applicable particularly to write-once optical information storage media.

When disk state data are recorded, each datum can be recorded in at least one byte of the disk zone 15-b. Examples of bytes, which record disk state data, include the bytes of a physical cluster, the bytes of an ECC block, or the bytes of a sector. Referring to FIG. 2A, the address of an area containing newly-recorded OPC data is recorded in an a-th byte, the address of an area containing the most recently recorded drive data is recorded in a b-th byte, and the address of an area containing the most recently recorded user data is recorded in a c-th byte. Also, data about whether additional recording is possible or impossible after the completion of recording can be recorded in a d-th byte. Each of these disk state data is recorded in one byte as shown in FIG. 2A, but it may be recorded in two or more bytes.

As shown in FIG. 2B, a byte is comprised of seventh through zeroth bits b7 through b0. If the address of an area containing newly recorded OPC data is recorded in one byte, it can be represented as a combination of bits. For example, the address can be recorded in the form of 0001b, 0010b, or 0011b using the seventh through fourth bits b7 through b4.

Likewise, the address of an area containing the finally recorded drive data and the address of an area containing the finally recorded user data can be recorded in different bytes. For example, in the recording of the data about the possibility or impossibility of additional recording, 00000000b can be recorded to represent the possibility of additional recording, and 00000001b can be recorded to represent the impossibility of additional recording.

The disk state data according to the present invention is updated every time user data is recorded. Preferably, the disk state data is updated in such a way that new disk state data is recorded in an area having no recorded data. In other words, disk state data are recorded in different areas so as to prevent duplicate recording of data in the same area. More preferably, new disk state data is recorded in an area next to the area containing the most recently recorded data. Each of the disk zone 15-b and the drive zone 15-c may be comprised of 1000 or more physical clusters.

In an optical information storage medium according to the present invention, a reproduction-only area and a recordable area are included in an area (e.g., a lead-in area) other than a user data area. In a method of recording data on the optical information storage medium according to the present invention, recent data about disk states is recorded in the recordable area. User data is first recorded, and

every time the user data is completely recorded, disk state data is newly recorded in the recordable area. If new disk state data is recorded, it is recorded in an area next to the area containing the most recently recorded disk state data.

Examples of the disk state data include the address of an area containing newly recorded OPC data, the address of an area containing finally recorded drive data, the address of an area containing finally recorded user data, and data representing whether additional recording after recording of user data is possible. At least one of these may be recorded as the disk state data. In addition, the address of an area, in which new control data is recorded every time user data recording is completed, may be recorded as the disk state data.

[Effect of the Invention]

As described above, in an optical information storage medium according to the present invention and a method of recording data on the optical information storage medium, every time user data recording is completed, recent data about a disk state is recorded. Thus, when new data is recorded, a pickup can accurately and rapidly access an area where the new data is to be recorded. Also, because the user data can be recorded using the recent data about a disk state, recording and/or reproduction performance can be improved.

What is claimed is:

1. An optical information storage medium, comprising

a user data area;

an area other than the user data area, comprising:

a reproduction-only area; and

a recordable area,

wherein new data about a disk state is recorded in the recordable area every time a recording of user data is completed.

2. The optical information storage medium of claim 1, wherein the new data about the disk state is at least one datum selected from an address of an area containing newly recorded optimum power control data, an address of an area containing most recently recorded drive data, an address of an area containing most

recently recorded user data, and data representing whether an additional recording after the recording of user data is possible.

3. The optical information storage medium of claim 1 or 2, wherein the new data about the disk state is recorded in the recordable area of a lead-in area.

4. The optical information storage medium of claim 1 or 2, wherein when data about the disk state is updated, the new data about the disk state is recorded in an area next to an area containing most recently recorded disk state data.

5. The optical information storage medium of claim 4, wherein the new data about the disk state is recorded as a combination of bits of at least one byte of the recordable area.

6. A method of recording data on an optical information storage medium in which a reproduction-only area and a recordable area are included in an area other than a user data area, the method comprising:

recording user data; and

recording new data about a disk state in the recordable area every time recording of user data is stopped.

7. The method of claim 6, wherein the new data about the disk state is at least one datum selected from an address of an area containing newly recorded optimum power control data, an address of an area containing most recently recorded drive data, an address of an area containing most recently recorded user data, and data representing whether an additional recording after the recording of user data is possible.

8. The method of claim 6 or 7, wherein the new data about the disk state is recorded in the recordable area of a lead-in area.

9. The method of claim 6 or 7, wherein when data about the disk state is updated, the new data about the disk state is recorded in an area next to an area containing most recently recorded disk state data.

10. The method of claim 9, wherein the new data about the disk state is recorded as a combination of bits of at least one byte of the recordable area.

FIG. 1

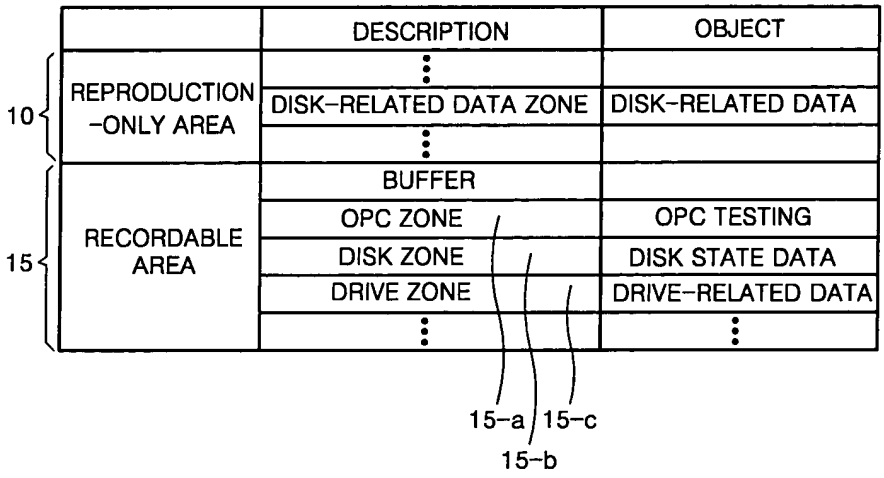

FIG. 2A

BYTE POSITION	CONTENTS	NUMBER OF BYTES
⋮		
a	ADDRESS OF AREA WHERE NEW OPC DATA HAS BEEN RECORDED	1
b	ADDRESS OF AREA WHERE THE LAST DRIVE DATA HAS BEEN RECORDED	1
c	ADDRESS OF AREA WHERE THE LAST USER DATA HAS BEEN RECORDED	1
d	DATA REPRESENTING WHETHER ADDITIONAL RECORDING IS POSSIBLE	1
⋮		

FIG. 2B

b7	b6	b5	b4	b3	b2	b1	b0
	ADDRESS OF AREA WHERE NEW OPC DATA HAS BEEN RECORDED						